ABSTRACT

A multi-wavelength optical transmitter which multiplexes a plurality of channels having different wavelengths into an optical signal for output includes lasers for generating mode-locked channels by corresponding incoherent light received in the lasers. The transmitter also has a semiconductor optical amplifier for amplifying, while in a gain saturation state, the optical signal multiplexed by the multiplexer/demultiplexer. Light from a broadband light source is directed by a circulator to the multiplexer/demultiplexer for demultiplexing among the lasers. Light back from the lasers is multiplexed and then directed by the circulator and amplified by a semiconductor optical amplifier for output external to the transmitter.